



January 19, 2016

Pamela Creedon, Executive Director
Central Valley Regional Water Quality Control Board
10200 Sun Center Drive, Suite 200
Rancho Cordova, CA 95670-6114

The Sacramento Valley Water Quality Coalition (SVWQC or Coalition) and Butte-Yuba-Sutter subwatershed respectfully request your determination that the subwatershed's Management Plan requirements for diazinon for the Gilsizer Slough represented drainages be deemed complete. The primary basis for this request is that Gilsizer Slough has been determined to meet the water quality objectives (WQOs) for diazinon. Additional factors supporting the request include the extensive outreach conducted with members and non-member agencies in the subwatershed and county, and focused in the represented drainage area to further augment and expand implementation of management practices to manage discharges of chlorpyrifos and other agricultural pesticides.

BACKGROUND FOR MANAGEMENT PLAN REQUIREMENT

The Gilsizer Slough monitoring location at George Washington Blvd. (GILSL) is in the Gilsizer Slough drainage and is not currently a representative monitoring site for SVWQC. The Gilsizer Slough drainage is currently represented by the Wadsworth drainage of the Butte-Yuba-Sutter subwatershed. The Management Plan for diazinon was originally triggered by exceedances observed in February 2006 and February 2007, with subsequent exceedances observed in January 2009 and February 2011.

DATA AND EXCEEDANCES

Relevant monitoring data for diazinon are provided in **Table 1**. The monitoring results indicate the following:

- A total of 45 sample events have been conducted for diazinon in Gilsizer Slough. There have been *four* (4) exceedances of the diazinon trigger limit, with the last exceedance observed in February 2011 (see **Table 1**).
- There have been 25 diazinon sample events conducted over the last 4.5 years with no exceedances since February 2011.

Evaluations of the four observed diazinon exceedances (based on the Basin Plan chronic WQO of 0.10 µg/L) and reported pesticide applications indicate that agriculture was a probable source of the observed diazinon exceedances. The detected diazinon concentration in the February 2006 water quality sample was associated with significant toxicity to *Ceriodaphnia* (20% reduction in survival), and occurred during the time that diazinon applications were made in the Gilsizer Slough drainage. Additionally, storm runoff was determined to be a likely contributor to the exceedance as approximately 2.0 inches of rain fell the day before the sampling event and 0.25 inches fell the day of the event. The

detected diazinon concentration in the February 2007 sample caused no toxicity and no reduction in *Ceriodaphnia* survival. Because diazinon applications were reported in the Gilsizer Slough drainage during the month of sampling, it is likely that agricultural application of the insecticide caused or contributed to the observed exceedance in February 2007. Again, storm runoff was to be a likely contributor to the exceedance as 0.25 inches of rain fell on the day of the sampling event. Agriculture was determined to be the probable source of the exceedance of the chronic and acute (0.16 µg/L) WQOs for diazinon in January 2009 based on timing of applications and rainfall. The January 2009 diazinon exceedance was not tested for toxicity.

Overall, these monitoring data indicate that diazinon is (1) currently meeting water quality objectives, (2) is no longer a chronic problem in the Gilsizer Slough, and (3) that agricultural management practices in the Gilsizer Slough drainage are adequate to prevent exceedances of the Basin Plan water quality objective for diazinon (see **Table 2**). To this end, we concluded that the practices that growers and applicators are implementing are sufficient.

SUMMARY OF EVALUATIONS SUPPORTING REQUEST

The following evaluations and factors support this request:

Assessment of Compliance with Water Quality Objectives	<ul style="list-style-type: none"> All samples analyzed for diazinon since February 2011 have been in compliance with the 0.10 µg/L Basin Plan chronic water quality objective (A total of 25 diazinon analyses were performed over the past 4.5 years). No detected concentrations of diazinon have been observed since May 2012, with a total of 19 diazinon analyses performed since that date.
Outreach and Education	<ul style="list-style-type: none"> Extensively conducted to increase awareness of issues for this Management Plan, and the completed Management Plan for malathion in this drainage (Outreach and education also included as part of implementation for Chlorpyrifos Management Plans in Lower Snake Creek and Pine Creek).
Implemented Practices	<ul style="list-style-type: none"> Already adequate to prevent diazinon exceedances (based on monitoring results, survey results, Farm Evaluations, and use patterns). Increased implementation for other Management Plans and Natural Resources Conservation Service (NRCS) Bay-Delta Initiative (BDI) grant projects (2012 – 2015) will further reduce risks of diazinon exceedances.

SOURCE EVALUATIONS

An evaluation of potential sources contributing to diazinon exceedances in the Gilsizer Slough drainage was completed in 2010¹. The source evaluation assessed the diazinon applications by agriculture, which crops applied diazinon prior to exceedances, irrigation patterns and methods, and environmental conditions relevant to potential discharges of diazinon, and potential non-agricultural sources of diazinon. The source evaluation included analysis of PUR data from the California Department of Pesticide Regulation (CDPR) and the Sutter County Agriculture Department. Conclusions of the source evaluations included:

¹ *Source Evaluation Report: Diazinon in Gilsizer Slough*. Sacramento Valley Water Quality Coalition. March 2010

- Based on evaluations of reported pesticide applications and predominant crops in the drainage, agriculture is a potential contributing source of some of the elevated diazinon concentrations observed in the Gilsizer drainage.
- The use of diazinon on peaches and prunes appears to account for the largest proportion of the agricultural applications of the organophosphate pesticide relevant to the observed exceedances. These crops should be the priority for surveys and outreach. Other crops receiving significant applications of diazinon in Sutter County include walnuts and tomatoes. Several other crops also use diazinon in the County. Common non-agricultural uses include landscape maintenance, structural pest control, and uncultivated agricultural land.
- Non-agricultural uses of diazinon are small (2%) compared to agricultural uses, but do represent a potential non-agricultural source of diazinon in the Gilsizer drainage when used for landscape maintenance. Non-reported and unregulated residential use may have contributed to detected diazinon. However, the impact of this potential source is expected to be minor since diazinon is no longer available as a retail product for unregulated residential use and any existing stockpiles are being used up.

Based on evaluations of reported pesticide applications and predominant crops in the drainage, agriculture was determined to be the probable cause of the diazinon exceedances observed during the period 2006 – 2009.

Based on a review of currently available pesticide use information in Sutter County for 1999 – 2013, the use of diazinon has shown a decreasing trend in both the Gilsizer Slough drainage and the County for irrigated agriculture since 2003/2004, and for all other uses (primarily for landscape maintenance) during the period 2000 – 2009. An increase in non-agricultural uses of diazinon has occurred in recent years (see **Figure 1**). Applications of diazinon on peaches and prunes (January and February), processing tomatoes (April and May), and walnut orchards (April through August) remain the primary uses of the pesticide in the County. The primary pathways of transport in agricultural applications are storm runoff discharges and drift from applications, and managing these has been the focus of outreach to control diazinon exceedances.

OUTREACH AND EDUCATION

Outreach and education efforts are not specifically cited as a basis for this request. However, growers in the subwatershed have been made aware of the Diazinon Management Plan, the consequences of any detections of diazinon, transport and transfer pathways, and recommended management practices. In addition to direct communication with all 2010-2011 registered users of diazinon, Butte-Yuba-Sutter Water Quality Coalition (BYSWQC) staff, Sutter County Resource Conservation District (RCD), and the Sutter County Agricultural Commissioner have continued to include information on the water quality risks, recommended practices, and the special circumstances regarding regulation of diazinon detections in our outreach activities. Outreach specific to the Diazinon Management Plan was conducted in tandem with outreach for the Malathion Management Plan in this drainage and the Chlorpyrifos Management Plans in the subwatershed. The combined outreach for these Management Plans has reached all of the Butte-Yuba-Sutter subwatershed membership (currently 1617 members) by newsletter, as well as the earlier direct contacts with all diazinon users in the Gilsizer drainage. Increased awareness by the growers and applicators has contributed to changes in practices and reduced diazinon discharges from agriculture and non-agricultural users, as evidenced by the lack of diazinon exceedances since February 2011.

Relevant Outreach & Education Conducted from 2009 – 2014

- 2009 – Nine (9) meetings were held by BYSWQC between January and September 2009 that included outreach and education related to Management Plans in the Sutter County portion of the Butte-Yuba-Sutter subwatershed.
- 2009 – Articles on best management practices (BMPs) were published in an October 2009 National Resources Conservation Service (NRCS) Agricultural Water Enhancement Program (AWEP) newsletter mailed to over 1,000 members.
- 2009 – BYSWQC conducted interviews in December 2009 regarding BMPs used among Coalition members in the Gilsizer Slough drainage.
- 2010/2011 – Management Practices Survey conducted by BYSWQC with responses received from nine Coalition members.
- 2011 – Irrigation water management workshop provided to 20 attendees by Sutter County RCD in July.
- 2012 – Spray Safe program workshop provided to 8 attendees by Sutter County Agricultural Commissioner in April, with representation and input by BYSWQC.
- 2012 – Spring 2012 Butte-Yuba-Sutter Newsletter including information on cover crop BMPs sent to entire membership.
- 2012 – Irrigation water management workshop provided to 12 attendees in April 2012 by Sutter County RCD to educate on over-irrigation and run-off through use of micro drip and sprinklers and use of soil moisture meters and flow meters to only irrigate the necessary amount.
- 2012 – Irrigation water management workshop provided to 25 attendees in July 2012.
- 2012 – Site visits to 53 growers provided by Sutter County RCD during Summer/Fall 2012 to assist growers with proper irrigation water management to avoid over-irrigation and run-off.
- 2012 – Letter regarding diazinon usage mailed in October to landowners in Gilsizer Slough who grow peaches and prunes (35 members contacted (100%) representing 2,255 acres).
- 2013 – Spray Safe program workshop provided to 75 attendees by Sutter County Agricultural Commissioner in January, with representation and input by BYSWQC.
- 2013 – First letter and survey for Gilsizer Diazinon MPPIG sent to four members in November who were involved in 2006, 2007, and 2009 diazinon exceedances.
- 2014 – Spray Safe program workshop provided to 100 attendees by Sutter County Agricultural Commissioner in January, with representation and input by BYSWQC.
- 2014 – Second letter and survey for Gilsizer Diazinon MPPIG sent to four members in February who were involved in 2006, 2007, and 2009 diazinon exceedances. Three members provided responses to the survey questions and one member responded that he hadn't applied diazinon in several years.
- Annually – Review pesticide use reports annually to incorporate any new users of diazinon into the direct outreach efforts described above.
- Annually – Continue ongoing education efforts for other potential diazinon uses in the Gilsizer Slough drainage.

SURVEYS

The degree to which management practices are implemented in the drainage was initially evaluated through surveys of selected high priority growers along Gilsizer Slough in 2009, and a report² summarizing these results was prepared and submitted to the Water Board in 2011. Thirteen individual high-priority parcels (nine members with 1,100 total acres) were identified representing the acreage with the highest potential to contribute to observed exceedances in this initial survey. Based on the responses from the initial targeted survey, it was concluded that most growers in the Gilsizer Slough drainage are implementing adequate best management practices to protect surface water quality.

- Awareness of IPM pesticide management practices, use of PCAs, and appropriate training were universally high, as was implementation of practices to control and minimize overspray and drift.
- Most growers implemented at least one type of relevant irrigation management and drainage practice and projected installing more within two years. The majority of growers indicated having storm runoff from their fields only in heavy rainstorms.
- Most operations also implemented additional practices to minimize discharge of pesticides in irrigation and storm runoff (e.g., sediment traps, vegetated ditches, tailwater returns systems).

A second survey consisting of the Farm Evaluations for agricultural operations in the Gilsizer Slough drainage was completed in March 2015 and has been compiled for the evaluation of implementation of a wide range of management practices, including irrigation, pesticide, and sediment management practices relevant to the drainage's Diazinon Management Plan. Preliminary results indicate high levels of awareness of issues related to pesticide exceedances, as well as high levels of implementation of management practices to reduce and eliminate pesticide exceedances.

MANAGEMENT PRACTICES

Based on the monitoring results, management practices in the drainage appear adequate to prevent discharges of diazinon to surface waters, and the high levels of awareness and implementation of practices is part of the basis for this request. We believe that the lack of diazinon exceedances related to agricultural applications can be attributed largely to changes in practices as a result of increased awareness of the growers and applicators, and that this resulted from the consistent and intensive outreach efforts of the BYSWQC and Sutter County Agricultural Commissioner. The specific implementation goals documented in the Diazinon Management Plan generally have been achieved for the drainage.

Implementation Goal	Percent Implementation
90% of growers in the drainage are aware of and consider IPM practices and choices before deciding to apply pesticides.	100% ⁽¹⁾
90% of growers in the drainage consult an agricultural pest control advisor (PCA).	85.7% ⁽²⁾
90% of growers in the drainage consider alternative products and lowest risk pesticide choice needed to accomplish pest management.	100% ⁽¹⁾
50% of growers in the drainage use electronic controller sprayer	--- ⁽⁴⁾

² *Grower Survey Report: Willow Slough*. Prepared for Sacramento Valley Water Quality Coalition By The Coalition for Urban/Rural Environmental Stewardship. 2011.

nozzles when applicable.	
90% of growers applying diazinon should implement one or more of the following optional practices (if appropriate):	96.6% ⁽²⁾
	<i>Individual Practice Percent Implementation</i>
Direct runoff and tailwater to settling ponds	15.8% ⁽²⁾
Direct runoff and tailwater to sediment basin	15.8% ⁽²⁾
Direct irrigation tailwater to tailwater return system	7.9% ⁽²⁾
Direct runoff and tailwater to wetlands	--- ⁽⁴⁾
Cover crops	36.0% ⁽²⁾
Vegetated filter strips (orchards and row crops)	25.2% ⁽²⁾
Vegetated drainage ditches	44.2% ⁽²⁾
100% of Coalition members growing peaches and prunes in the drainage will be contacted by the Coalition or representatives and informed of the management practices implementation goals and schedule.	100% ⁽³⁾
100% of Coalition members growing peaches and prunes in the drainage will be surveyed to assess current management practice level, progress toward implementation goals, and general awareness of relevant management practice alternatives.	100% ⁽³⁾
1. Percent implementation response based on the fact that staff from the Sutter County Agricultural Commissioner's office discuss groundwater and surface water protection regulations, dormant spray regulations, and BMPs with all pesticide permit applicants (personal communication with Stephen Scheer, Deputy Agricultural Commissioner, Sutter County, November 16, 2015). 2. Minimum percent implementation based on 2015 Farm Evaluation Survey results. 3. Percent implementation provided by Butte-Yuba-Sutter Water Quality Coalition. 4. Percent implementation of goal indeterminate based on available information.	

OTHER RELEVANT INFORMATION

Implementation of additional practices continues to be pursued as part of the Management Plan for chlorpyrifos (in progress) in the drainage. Additional implementation of relevant practices is also anticipated to occur through the continuing Natural Resources Conservation Service (NRCS) Environmental Quality Incentives Program (EQIP) cost-share program. Although the additional implementation of practices does not appear to be necessary to control and prevent diazinon exceedances, these efforts will also further reduce the risks related to diazinon use in the drainage.

CONCLUSIONS

Based on the monitoring results summarized above, Gilsizer Slough is meeting the Basin Plan water quality objectives for diazinon and has done so for the last 4.5 years. Outreach and education efforts and implemented practices have achieved the goals of the Diazinon Management Plan and resulted in meeting the water quality objectives. Based on the findings presented in this request, we conclude that agricultural practices implemented in the Gilsizer Slough drainage have been and continue to be sufficient to prevent agricultural contributions to exceedances of diazinon in the Gilsizer Slough drainage. Additionally, the soon-to-be-completed Management Plan for chlorpyrifos will continue to pursue implementation of additional practices, and NRCS BDI grants have been awarded for fiscal years

2012 – 2016 to augment management practices in the represented drainages that will further reduce the risk of diazinon discharges and exceedances in the drainage.

As specified in the Management Plan Completion section of the MRP-1: Management Plan Requirements for Surface Water and Groundwater (Waste Discharge Requirements General Order for Growers within the Sacramento River Watershed that are Members of a Third Party Group; Order R5-2014-0030-R1), we respectfully request that you make a determination of the completeness of this Management Plan.

Sincerely,



David J. Guy
President
Northern California Water Association

Cc: Sue McConnell
Susan Fregien
Lexi Everhart
Bruce Houdesheldt
Claus Suverkropp

TABLES AND FIGURES

Table 1: Monitoring results for diazinon in Gilsizer Slough water quality samples.

Event	Sample Date	Diazinon (µg/L)	Notes
9	02/28/2006	0.154	1
10	06/16/2006	0.032	
12	05/24/2006	<0.002	
13	06/21/2006	<0.002	
14	07/19/2006	<0.002	
15	08/16/2006	<0.002	
16	09/20/2006	<0.002	
17	02/11/2007	0.101	1
19	04/18/2007	<0.002	
20	05/16/2007	<0.002	
21	06/19/2007	<0.002	
22	07/18/2007	<0.002	
23	08/22/2007	0.005	
24	09/18/2007	<0.002	
25	12/20/2007	<0.002	
35	01/27/2009	0.6007	1, 2
36	02/18/2009	0.0931	
47	01/21/2010	0.0628	
48	02/17/2010	0.0175	
60	02/16/2011	0.1352	1
61	03/16/2011	0.0195	
63	05/17/2011	<0.002	
71	01/24/2012	0.0128	
72	02/23/2012	0.028	
74	04/19/2012	<0.002	
75	05/15/2012	0.009	
76	06/20/2012	<0.002	
77	07/18/2012	<0.002	
78	08/22/2012	<0.002	
83	01/22/2013	<0.0005	
84	02/21/2013	<0.0005	
85	03/20/2013	<0.0005	
87	05/21/2013	<0.0005	
88	06/18/2013	<0.0005	

Event	Sample Date	Diazinon (µg/L)	Notes
89	07/17/2013	<0.0005	
90	08/20/2013	<0.0005	
94	12/11/2013	<0.0005	
95	01/14/2014	<0.0005	
99	05/20/2014	<0.0005	
101	07/15/2014	<0.0005	
102	08/20/2014	<0.0005	
103	09/16/2014	<0.0005	
107	01/20/2015	<0.004	
110	04/21/2015	<0.0005	
111	05/19/2015	<0.004	

1. Exceedance of diazinon chronic trigger limit (0.10 µg/L, Basin Plan).
2. Exceedance of diazinon acute trigger limit (0.16 µg/L, Basin Plan).

Table 2: Summary of Agricultural Practices Implemented in Willow Slough Bypass and Represented Drainages (Source: 2015 Farm Evaluation Survey).

PRACTICE CATEGORY	Acres Reported	Percent of Total Acres Reported (8,897 acres)
Individual Practice		
PESTICIDE APPLICATION PRACTICES		
County Permit Followed	8,301	93.3
Follow Label Restrictions	8,255	92.8
Monitor Wind Conditions	8,245	92.7
Attend Trainings	8,213	92.3
Avoid Surface Water When Spraying	8,117	91.2
Monitor Rain Forecasts	7,814	97.8
Use PCA Recommendations	7,623	85.7
Use Drift Control Agents	7,491	84.2
Use Appropriate Buffer Zones	7,214	81.1
End of Row Shutoff When Spraying	7,204	81.0
Reapply Rinsate to Treated Field	4,704	52.9
Sensitive Areas Mapped	3,988	44.8
Use Vegetated Drain Ditches	3,565	40.1
Target Sensing Sprayer used	1,564	17.6
Chemigation	1,120	12.6
No Pesticides Applied	140	1.6
Other1	37	0.4
WHO DO YOU HAVE HELP DEVELOP YOUR CROP FERTILITY PLAN?		
Pest Control Advisor (PCA)	7,615	85.6
Certified Crop Advisor (CCA)	4,338	48.8
UC Farm Advisor	3,635	40.9
Professional Soil Scientist	2,834	31.8
Professional Agronomist	970	10.9
Independently Prepared by Member	256	2.9
None of the above	94	1.1
No Selection	88	1.0
Certified Technical Service Providers by NRCS	70	0.8
DOES YOUR FARM HAVE THE POTENTIAL TO DISCHARGE SEDIMENT TO OFF-FARM SURFACE WATERS?		
No	6,480	72.8

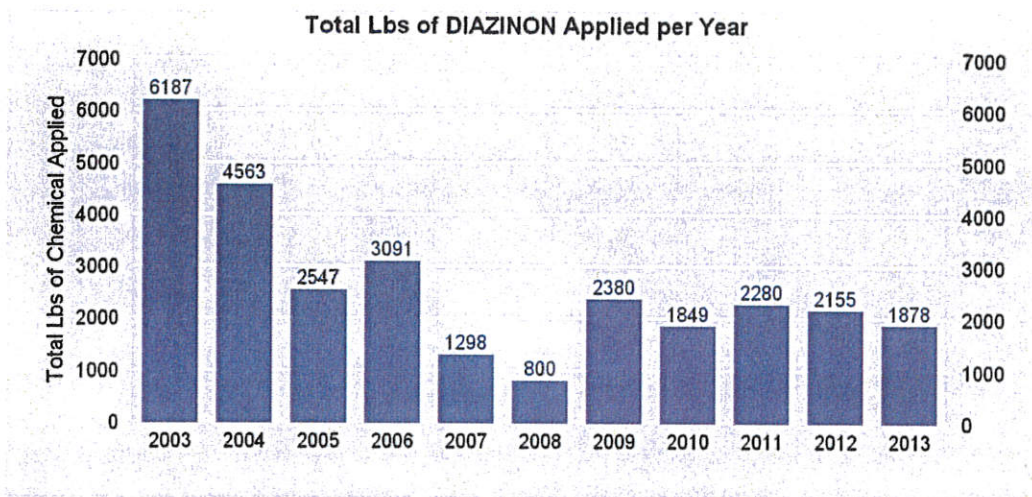
<i>PRACTICE CATEGORY</i>	Acres Reported	Percent of Total Acres Reported (8,897 acres)
Individual Practice		
Yes	2,417	27.2
IRRIGATION PRACTICES		
Micro Sprinkler	4,527	50.9
Drip	1,276	14.3
Flood	806	9.1
Sprinkler	803	9.0
Furrow	379	4.3
No Selection	304	3.4
Border Strip	300	3.4
SECONDARY IRRIGATION		
No Selection	4,920	55.3
Flood	1,780	20.0
Sprinkler	709	8.0
Furrow	558	6.3
Border Strip	153	1.7
Drip	133	1.5
Micro Sprinkler	96	1.1
NITROGEN MANGEMENT METHODS TO MINIMIZE LEACHING PAST THE ROOT ZONE		
Soil Testing	6,982	78.5
Tissue/Petiole Testing	4,454	50.1
Split Fertilizer Applications	4,185	47.0
Fertigation	2,625	29.5
Irrigation Water N Testing	2,387	26.8
Foliar N Application	2,239	25.2
Cover Crops	2,020	22.7
Do Not Apply Nitrogen	848	9.5
No Selection	216	2.4
Variable Rate Applications using GPS	153	1.7

IRRIGATION PRACTICES FOR MANAGING SEDIMENT AND EROSION

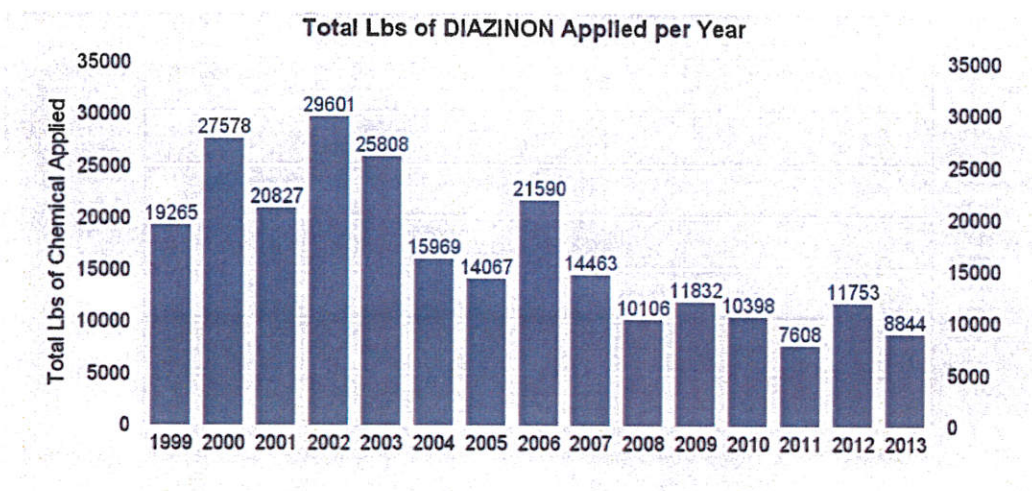
Use drip or micro-irrigation to eliminate irrigation drainage.	6,204	69.7
The time between pesticide applications and the next irrigation is lengthened as much as possible to mitigate runoff of pesticide	4,248	47.7

<i>PRACTICE CATEGORY</i>	Acres Reported	Percent of Total Acres Reported (8,897 acres)
Individual Practice		
residue.		
Shorter irrigation runs are used with checks to manage and capture flows.	3,428	38.5
No irrigation drainage due to field or soil conditions.	1,700	19.1
In-furrow dams are used to increase infiltration and settling out of sediment prior to entering the tail ditch.	1,346	15.1
Catchment Basin.	903	10.1
Tailwater Return System.	699	7.9
Use of flow dissipaters to minimize erosion at discharge point.	365	4.1
No Selection	304	3.4
Other	238	2.7
PAM (polyacrylamide) used in furrow and flood irrigated fields to help bind sediment and increase infiltration.	70	0.8
<i>CULTURAL PRACTICES TO MANAGE SEDIMENT AND EROSION</i>		
Soil water penetration has been increased through the use of amendments, deep ripping and/or aeration.	5,298	59.5
Minimum tillage incorporated to minimize erosion.	4,354	48.9
Vegetated ditches are used to remove sediment as well as water soluble pesticides, phosphate fertilizers and some forms of nitrogen.	3,930	44.2
Cover crops or native vegetation are used to reduce erosion.	3,199	36.0
Berms are constructed at low ends of fields to capture runoff and trap sediment.	3,182	35.8
Crop rows are graded, directed and at a length that will optimize the use of rain and irrigation water.	3,125	35.1
Storm water is captured using field borders.	2,855	32.1
Vegetative filter strips and buffers are used to capture flows.	2,239	25.2
No storm drainage due to field or soil conditions.	1,558	17.5
Sediment basins / holding ponds are used to settle out sediment and hydrophobic pesticides such as pyrethroids from irrigation and storm runoff.	1,408	15.8
Field is lower than surrounding terrain.	1,099	12.4
Subsurface pipelines are used to channel runoff water.	898	10.1
Hedgerows or trees are used to help stabilize soils and trap sediment movement.	894	10.0
Creek banks and stream banks have been stabilized.	351	3.9

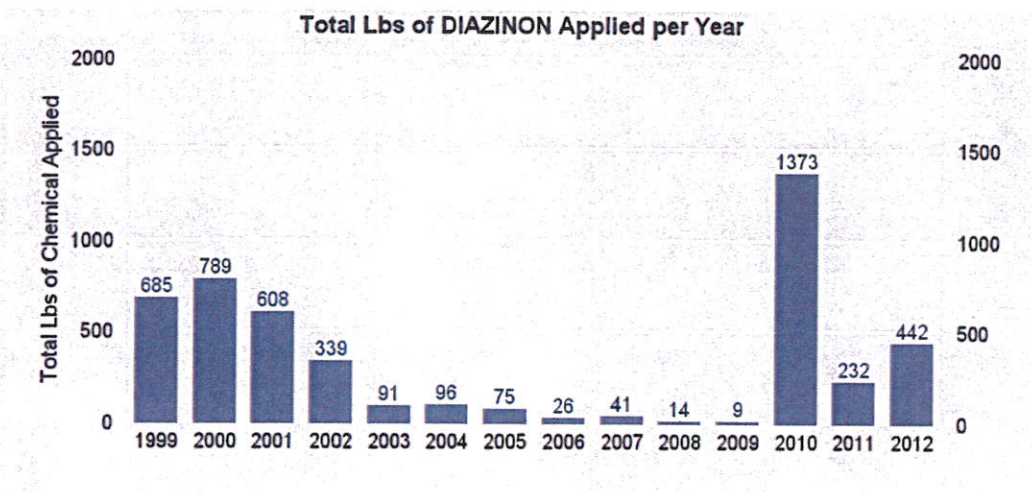
<i>PRACTICE CATEGORY</i>	Acres Reported	Percent of Total Acres Reported (8,897 acres)
Individual Practice		
No Selection	304	3.4



(a) Irrigated Agriculture in Gilsizer Slough Drainage.



(b) Irrigated Agriculture in Sutter County.



(c) All Other Uses in Sutter County.

Figure 1: Annual Diazinon Use (lbs/year) for (a) Irrigated Agriculture in Gilsizer Slough Drainage, (b) Irrigated Agriculture in Sutter County, and (c) All Other Uses in Sutter County: 1999 – 2013.